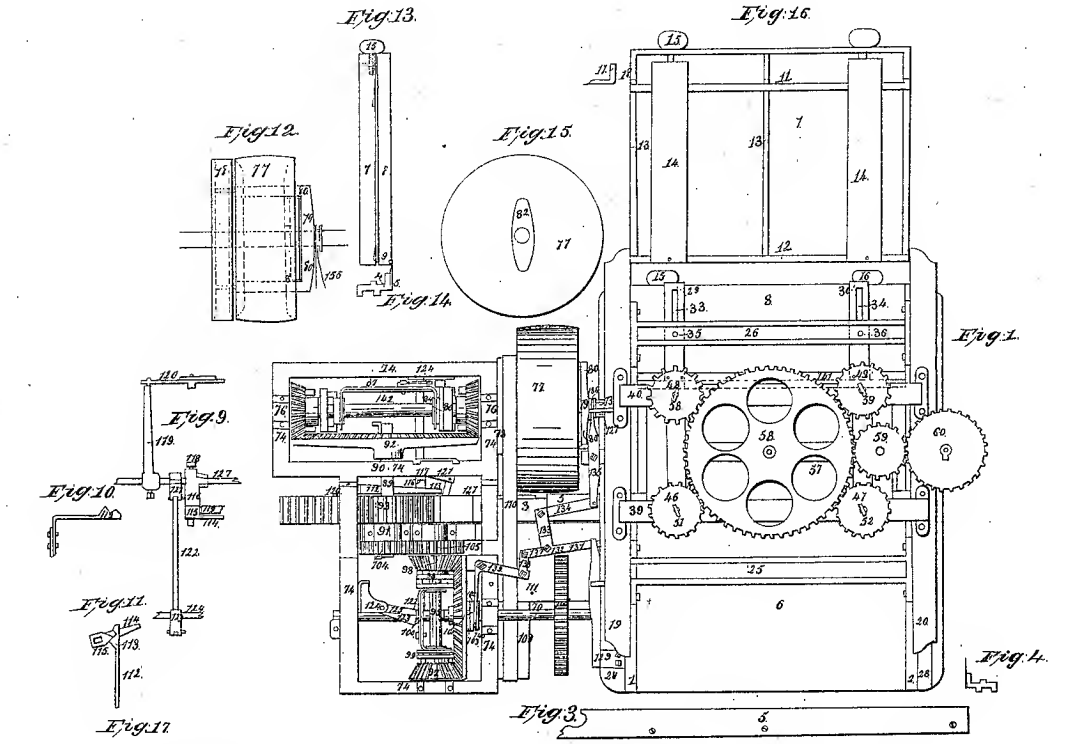
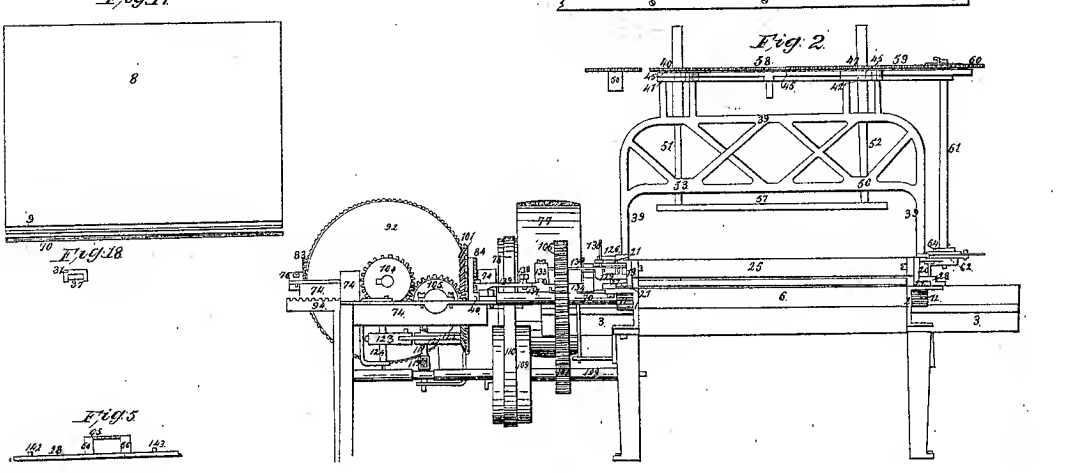
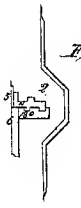
J. Skinner,

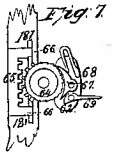
Cutting Veneers,

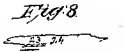
No. 387. Patented Sept. 21, 1837.











UNITED STATES PATENT OFFICE.

JOSEPH SKINNER, OF STOCKBRIDGE, MASSACHUSETTS.

MACHINE FOR CUTTING VENEERS.

Specification of Letters Patent No. 387, dated September 21, 1837.

To all whom it may concern:

Be it known that I, JOSEPH SKINNER, of Stockbridge, in the county of Berkshire and State of Massachusetts, have made a new and useful Improvement, being a Machine for Cutting Veneers, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.

The principal moving parts of this machine are supported by two parallel bearers, (1, 2) which have flanges projecting from their upper and lower edges at right angles outward. A movable stock (3), having a horizontal projection (4) from the upper edge represented in section at Figure IV, crosses the bearers near their centers where they widen downward (see Fig. VI) that the openings in their upper edges through which the stock passes may not too much impair their strength. The cutting knife (5) (see Figs. III and IV) is of the same length of the stock, and is firmly attached to the horizontal projection 4, thereof, the face being upward and nearly on a level with the upper edges of the bearers. The bearers are permanently connected by plates (6 and 7) (plate 7 cannot be seen in the principal drawings as it is covered by plate 8 but it is represented in section at Figs. XIII and XVI) or cross work. The first plate (6) extends from the back of the knife to the ends of the bearers; its face being nearly on a level with their upper edges and has downward flanges at the ends which are bolted firmly to them. A very strong flange 180 (see Fig. VI) projects downward from the edge of the plate 6 next the knife, in which are several grooves into which the movable stock is made to fit very exactly for the purpose of keeping it steady in its operation. The second plate (7) extends from the edge of the knife to the other ends of the bearers, its face being on a level with their lower edges. It has flanges projecting upward quite around the border; those at the ends being firmly bolted to the bearers. The third plate (8) is of nearly the same form and dimensions of the second—is placed directly over it with the face upward and on a level a little below the face of the first plate.

In a groove or rabbet (9) (see Figs. XIII and XVII) made in the edge next the knife of the third plate is placed what I call a compressing slide (10) which rises a little above the face of the plate; or instead of the slide a roller may be used.

Between the first and second plates and parallel with the knife are two adjusting slides (11, 12) represented in section at Figs. XIII and XVI, having their under sides inclined. One of these slides is placed on the flanges of the second plate, the outward edge on a line with the edges of the second and third plates next the knife. The other is placed at a proper distance from the opposite edges of the plates parallel with the first. Both are bedded just their thickness into the flanges (13) of the second plate. The beds being wider than the slides to admit of their sliding laterally. The adjusting slides are connected near their ends by plates (14). Thumb screws (15, 16) are inserted through the outward flange of the second plate 7 a little below the ends of the connecting plates and work in boxes (17, 18) attached to their undersides near their ends. By turning the thumb screws (15, 16) either way the slides are made to advance and recede. Hence by their rising and falling on their inclined beds the third plate 8 which rests upon them may be adjusted relatively to the knife at pleasure.

Two slides (19, 20) which with their appendages form a carriage for moving the log to be cut, are placed upon the upper flanges of the bearers. These slides have flanges (21, 22) projecting at right angles outward from their upper and lower edges. The under sides of about half the length of the lower flanges are indented with teeth thus forming them into racks (23, 24) by which the carriage is moved. The racks are represented in section at Fig. VIII.

The carriage slides are connected by cross ties (25, 26) at a suitable distance from either end. They are also kept in contact with the bearers by the binders 27, 28, which are confined to the bearers by screw-bolts and lap over the carriage racks so as to confine them down, and yet permit them to slide end-wise.

Parallel to the cross ties, inward, and just above the face of the plates are movable bars (141) the conical parts represented with dotted lines supported by lateral pieces (29, 30) which pass under the cross ties. Only one of the movable bars is represented in the drawing—being alike and placed the same distance from either end of the machine. The lateral pieces have grooves in their un-

der sides (one of which is represented in section at Fig. XVIII) and slots 33, 34 in their longitudinal centers which extend nearly their whole length. Screw bolts 35, 36, pass through openings in the ties, and the slot in the lateral pieces and work in boxes one of which is represented at Fig. XVIII 37 which are movable in the grooves. Thus the bars are made movable and can be accommodated to logs of different sizes. Cross framings 39, 40 are placed upon the carriage slides having their feet firmly secured to the same, and they terminate at top with four horizontal caps 41, 42, 43, 44. A connecting piece (45) is placed upon the horizontal caps which binds them all together. Centrally over each of the horizontal caps is placed a toothed wheel, 46 47, 48, 49, each having a cylindrical nave (50) projecting from the underside and occupying an opening through the connecting piece and horizontal caps.

Four perpendicular screws, 51, 52, 53, 54, having square shanks are supported by the cross framings; their shanks passing up through the cylindrical naves and square openings in the center of the nave wheels and the screws passing down through boxes 55, 56, in the sills of the cross framings.

A large horizontal plate (57) is suspended by the lower ends of the perpendicular screws directly over the center of the machine. A large toothed wheel (58) is placed centrally between and gears into the four nave wheels; its axis working into the connecting piece, and has its lower end in- 60 are placed upon a projecting part of the connecting piece—one gearing into the large central wheel, and the other gearing into the one fixed upon the upper end of a perpendicular shaft (61) which passes down through the projecting part of the connecting piece, and has its lower end inserted into a piece projecting horizontally from the center of the upper flange of one of the carriage slides. On the lower end of the perpendicular shaft immediately above the carriage slide is a reciprocating piece (62) movable on the shaft; the inward end terminating with a toothed segment 63 See Fig. VII.

Immediately above the reciprocating piece a ratchet wheel (64) is made fast on the shaft. A rack 65, having a downward projection 66 see Figs. II, V and VII at either end, gears into the segment on the reciprocating piece—the downward projections 66 pass through and slide in slots 181 (see Fig. VII) in the upper flanch of the carriage slide, and are acted upon by two pins 142 and 143 (see Fig. V) which are fixed to the binder 28. On the outward end of the reciprocating piece, a clutch 67 with its spring 68 is fixed for taking hold of the ratchet when moving in one direction. Also a movable cam lever, 69 for disengaging the ratchet as occasion may require. A working shaft 70 passes through the parallel bearers at about the longitudinal center of the plate 6; one end projecting beyond the bearer for receiving working wheels. On the working shaft are fixed two working pinions 71, 72, their teeth projecting upward through the upper flanges of the bearers 1 and 2 sufficiently to gear into the carriage racks. The principal driving gears rest upon a supporting frame 74.

The principal driving shaft has one end resting in a box 75 attached to the carriage binder 27 and extends quite across the supporting frame and is secured to the same by a box cap 76. At a little distance from the inner end of the driving shaft is loosely placed the principal driving pulley 77, and by its side a loose minor pulley 78, represented in section at Fig. XII with the accompanying clutch hereafter described. Between the driving pulley and the end of the shaft is a double acting clutch 79 the arms 80 of which being turned at right angles and having small inward projections 81 near the angles, extend quite through the driving pulley and act alternately upon the arm 82, which is fast on to the shaft, and the minor pulley. Upon the driving shaft just within the sides of the supporting frame, are two loose bevel pinions 83, 84 between them, two shifting clutches 85, 86 so connected by a bracket 87, the feet of which work in grooves in the naves 88 of the clutches that as they are shifted they become alternately engaged with either pinion. A lateral shaft 89 is placed centrally between the pinions of the driving shaft and rests upon two cross pieces 90, 91, of the supporting frame.

On the end of the lateral shaft next the driving shaft is a large bevel wheel 92, so situated as to gear with the driving pinions at opposite sides. A spur toothed pinion 93 is also fixed upon the lateral shaft, the under side of which gears into a rack 94, connected with the knife stock to give it movement. A minor driving shaft 95 is placed upon the supporting frame, laterally to and near the end of the principal working shaft, and having upon it two bevel pinions 96, 97, and two clutches 98, 99 connected by a bracket 100 all upon the same principle of those on the principal driving shaft.

Upon the extreme end of the principal working shaft which extends within, and is secured by a box cap to the side of the supporting frame, is a minor bevel wheel, 101, so situated as to gear into both the pinions on the minor driving shaft at opposite sides. At the back of the minor bevel wheel, which is loose upon its axis is a movable clutch 102, which, by being connected with the arm 103 which is fixed upon the working shaft, occasionally causes the minor bevel

wheel to turn the working shaft. Two spur wheels, 104, 105, by gearing together, form a connection between the lateral shaft and the minor driving shaft.

The machine is elevated upon six uprights of any convenient length.

Upon the principal working shaft, about midway between the supporting frame and the bearer next to it is a spur wheel 106 which gears into a pinion 107 which is fixed on a shaft 108 directly under it. Said shaft is supported at the ends by two of the legs of the machine, and has a pulley 109 fixed upon it at a point directly in a line with the minor pulley 78 and a connection is formed between them by a bolt 110. A plate 111 is fixed between the supporting frame and the bearer next to it, being firmly bolted to either for the purpose of adding stability to the machine and supporting some of the fixtures.

To form the necessary connection between the brackets that move the clutches on the major and minor driving shafts, and give them their proper simultaneous movements I fix to the side of the supporting frame a spring 112 on the under side and near the vibrating end of which is a projection 113 represented in section at Fig. X the sides of which are inclined so as to terminate in an acute angle.

A mortise lever 114—see Figs. IX, X, and XI—the mortised part or head 115 terminating upward in an angle similar to the angle of the projection on the end of the spring, is placed upon the square end of a movable arm 116 in such a position that when the mortise lever is moved either way, the spring is forced by the inclined planes upward sufficiently far for the angles to pass each other. The elastic power of the spring then forces the mortise lever a certain distance forward and tends to confine it there. A little looseness of the mortise lever on the tenon of the arm enables it to pass the dead points either way. The movable arm extends horizontally from a perpendicular shaft 117 which passes through it near the end—a set screw 118 being inserted in the end to facilitate its adjustment. A second arm 119 is fixed upon the perpendicular shaft, the extreme end of which connects with the lower end of a perpendicular lever 120 which is movable on its center and has its upper end connected with the bracket belonging to the driving shaft. A third arm 121 is fixed upon the perpendicular shaft—the extreme end of which connects with a tie 122 which extends to and connects with an arm 123 fixed upon a second perpendicular shaft, 124. A second arm 125 upon the second perpendicular shaft is connected with the bracket belonging to the minor driving shaft.

Two gage pins 126, 127 in the side of the rack connected with the knife stock, at a suitable distance from either end, alternately come in contact with the mortise lever 114 giving to it the necessary movements.

A connection is formed between the double acting clutch on the principal driving shaft and the clutch 102 on the principal working shaft for the purpose of shifting them simultaneously, upon the same principle of those between the above described clutches belonging to the principal driving shaft and those belonging to the minor driving shaft. The spring 129 the end of which is similar to spring 112 which is attached to the binder 1, acting upon the mortise lever, 130 (similar to 114) which is on the principal arm 131 of the tri-arm 132 one of the inferior arms 133 of which being connected by means of the tie 134 to the forked lever 135 which is movable on its center—the forked end of which occupies a groove in the hub 136 of the double acting clutch. The other inferior arm 137 of the tri-arm, being connected by the tie 138 with the forked elbow 139—the fork of which occupies a groove in the hub 140 of the shifting clutch which is on the working shaft.

Operation: The log that is to be cut after being properly squared is placed upon the third plate with its side contiguous to the knife. The suspended plate 57 is then brought down firmly upon it and the bars 141 brought in contact with its sides. Power sufficient to put the gear in motion being applied to the driving pulley 77 by a belt, the knife is made to complete its proper movement in one direction when the carriage with the log has performed but a small part of its proper movement in one direction, the knife being intended to make several movements either way while the carriage with the log is making a single movement: Accordingly at each vibration of the knife, the gage pins 126—127 in the side of the rack come in contact with the mortise lever 114 causing it to move until the angular points of the mortise lever and spring pass each other. The action of the spring, then instantaneously forces the mortise lever further forward, by which sufficient motion is communicated to the bracket 87 that governs the clutches on the driving shaft, by means of the arms and lever that connect them, to disengage the clutch from the pinion that gave motion to the large wheel, and engage the other clutch with the pinion that gear into the opposite side of the wheel. This shifting of the clutches reverses the motion of the bevel wheel 92 and consequently the knife, and would also communicate the same reversed motion to the carriage, did not the clutches on the minor driving shaft shift simultaneously with those on the principal driving shaft in consequence of their connection with

the mortise lever. In consequence of this simultaneous shifting of the clutches, the knife vibrates endwise while the carriage with the log continue in the same direction. The knife being elevated above the face of the third plate 8 on which the log is placed, just the intended thickness of a veneer, and the compressing slide projecting a little above the face of said plate near the edge of the knife, the wood at the point of impact of the edge of the knife is so compressed and confined as to be effectually prevented from separating in the grain, in advance of the edge, or until the knife separates it. Thus as the log is passed over the knife a veneer is taken off from its under side, uniform in thickness without being split, fractured, or broken. When the log has nearly passed the knife, there being gage pins (126 127) projecting horizontally from the outward edge of the upper flange of the carriage slide (19) at a suitable distance from either end, one of them comes in contact with the mortise lever (130) causing it to shift, upon the same principle as the mortise lever 114 described above, communicating a movement to the double acting clutch 79 on the driving shaft by means of the arms and levers that connect them, which movement disengages the clutch from the arm 82 which is fast on the driving shaft and engages it with the minor pulley 78. Simultaneously with the shifting of the double acting clutch (79) the clutch (102) on the working shaft is disengaged from the minor bevel wheel (101) by means of its connection with the mortise lever 130. Thus the gears that drive the knife remain at rest while the minor pulley (78) being made to move with the major pulley 77 communicates a reverse motion to the working shafts (70) through the medium of the secondary belt (110) pulley, (109) pinion, (107) and spur wheel (106) and runs the carriage with the log back. A little before the back movement of the carriage is terminated, the other gage pin in the carriage slide 19 comes in contact with the mortise-lever 130 shifting it and consequently the clutches of the driving and working shafts to their first positions. At the same time that the gage pin on the carriage-slide (19) act on the mortise lever (130) the gage pins (142 143) in the upper side of the binder (28) come in contact with the projections 66 on the ends of the little rack (65) that pass through and project below the upper flange of the carriage slide, (20) moving the rack (65) and reciprocating piece (62) at the termination of the forward run of the carriage in such direction that the clutch (67) slides on the ratchet (64). But at the termination of the backward run of the carriage, the clutch 67 takes hold of the ratchet and gives a movement to the upright shaft 61, the wheels upon the connecting piece and consequently the perpendicular screws, sufficient to bring down the suspended plate 57 firmly again on the log.

A knife and compressing slide or roller for cutting upon the above described principle may be greatly varied with respect to both form and movement.

The mechanical arrangements necessary for making the fundamental principle available may be greatly varied so as to cut either endwise, obliquely, or from a round log. Hard timber may be softened by steaming or otherwise heating to facilitate the cutting the veneers, and to render them more pliant and yielding.

Now what I the said Joseph Skinner claim as my invention and which I desire to secure by Letters Patent, is—

The use of a slide or roller in conjunction with a knife or cutting tool, substantially as above described for cutting veneers or thin pieces of wood for all useful purposes, the object of said slide or roller being so to compress the wood during the operation of cutting, as near as possible to the point of impact of the edge of the knife, or cutting tool, as to prevent the wood from parting or separating in the grain in advance of the knife.

JOSEPH SKINNER.

Witnesses:
Wm. P. Elliott,
James Rowe.